

CLAIM AMENDMENTS

Please replace the pending claims with the following listing of claims:

1-24. **(Cancelled)**

25. **(Previously Presented)** A planar lightwave circuit having a core and a clad which are formed on a substrate, comprising:

at least one input optical waveguide which inputs signal light;

mode coupling means for coupling a fundamental mode which is part of the inputted signal light, to at least either of a higher-order mode and a radiation mode, or mode re-coupling means for re-coupling at least either of the higher-order mode and the radiation mode to the fundamental mode; and

at least one output optical waveguide which outputs signal light;

said mode coupling means or said mode re-coupling means being an optical waveguide which has at least one of a core width and height varied continuously.

26. **(Previously Presented)** A planar lightwave circuit as defined in claim 25, wherein the variation of at least one of the core width and height of the optical waveguide is within $\pm 8 \mu\text{m}$ per unit length ($1 \mu\text{m}$) in a propagation direction of the signal light.

27. **(Previously Presented)** A planar lightwave circuit as defined in claim 25, wherein said mode coupling means or said mode re-coupling means is an optical waveguide which has at least one of the core width and height made zero partly.

28. **(Previously Presented)** A planar lightwave circuit as defined in claim 26, wherein said mode coupling means or said mode re-coupling means is an optical waveguide which has at least one of the core width and height made zero partly.

29. **(Previously Presented)** A planar lightwave circuit as defined in claim 25, wherein at least one of said mode coupling means and said mode re-coupling means includes at least one insular core portion which is spaced from the core of said optical waveguide.

30. **(Previously Presented)** A planar lightwave circuit as defined in claim 26, wherein at least one of said mode coupling means and said mode re-coupling means includes at least one insular core portion which is spaced from the core of said optical waveguide.

31. **(Previously Presented)** A planar lightwave circuit as defined in any of claims 25, wherein at least one of said mode coupling means and said mode re-coupling means includes at least one insular clad portion having a refractive index equal to that of the clad, within the core of the optical waveguide.

32. **(Previously Presented)** A planar lightwave circuit as defined in any of claims 26, wherein at least one of said mode coupling means and said mode re-coupling means includes at least one insular clad portion having a refractive index equal to that of the clad, within the core of the optical waveguide.

33. **(Previously Presented)** A planar lightwave circuit comprising an optical waveguide lens which has a core and a clad formed on a substrate, wherein the optical waveguide lens comprises:

at least one input optical waveguide which inputs signal light;

mode coupling means for coupling part of the inputted signal light to a higher-order mode and a radiation mode;

mode re-coupling means for re-coupling the signal light coupled to the higher-order mode and the radiation mode by said mode coupling means, to output signal light; and

at least one output optical waveguide for outputting the output signal light;

said mode coupling means and said mode re-coupling means being optical waveguides each of which has at least one of a core width and height varied continuously.

34. **(Previously Presented)** A planar lightwave circuit comprising a cross waveguide in which at least two optical waveguides having a core and a clad formed on a substrate cross, wherein the cross waveguide comprises:

at least two input optical waveguides which input signal light;

mode coupling means for coupling part of the inputted signal light to a higher-order mode and a radiation mode;

mode re-coupling means for re-coupling the signal light coupled to the higher-order mode and the radiation mode by said mode coupling means, to output signal light;

at least two output optical waveguides which output the output signal light, and

an optical-waveguide crossing portion being a part at which two virtual optical waveguides rectilinearly extending from the input waveguides toward the output waveguides overlap;

said mode coupling means and said mode re-coupling means being optical waveguides each of which has a core width varied continuously;

said optical-waveguide crossing portion being such that a core width of an optical waveguide at a position between an end of said optical-waveguide crossing portion on a side of said input optical waveguides and a central part of said optical-waveguide crossing portion is greater than the core width of the optical waveguide at an end of said optical-waveguide crossing portion on the side of said input optical waveguides and the core width of the optical waveguide at the central part of said optical-waveguide crossing portion, and that the core width of the optical waveguide at a position between the central part of said optical-waveguide crossing portion and an end of said optical-waveguide crossing portion on a side of said output optical waveguides is greater than the core width of the optical waveguide at the central part of said optical-waveguide crossing portion and the core width of the optical waveguide at the end of said optical-waveguide crossing portion on the side of said output optical waveguides.

35. **(Previously Presented)** A planar lightwave circuit comprising an optical branch circuit which has a core and a clad formed on a substrate, wherein the optical branch circuit comprises:

one input optical waveguide which inputs signal light;

mode coupling means for coupling part of the inputted signal light to a higher-order mode and a radiation mode;

mode re-coupling means for re-coupling the signal light coupled to the higher-order mode and the radiation mode by said mode coupling means, to output signal light; and

at least two output optical waveguides which output the output signal light;

said mode coupling means and said mode re-coupling means being optical waveguides each of which has a core width varied continuously.

36. **(Previously Presented)** A planar lightwave circuit comprising a slab type coupler which has a core and a clad formed on a substrate, wherein the slab type coupler comprises:

at least one, first input/output optical waveguide which inputs/outputs a light signal;

an optical slab waveguide which is optically connected to the first input optical waveguide; and

at least two, second input/output optical waveguides which are optically connected to said optical slab waveguide, and which input/output light signals; and

that said second input/output optical waveguides comprise mode coupling means for coupling part of the inputted/outputted signal light to at least either of a higher-order mode and a radiation mode, and converting the coupled part into a plane wave at an end of said optical slab waveguide;

said mode coupling means being an optical waveguide which has a core width varied continuously.

37. **(Previously Presented)** A planar lightwave circuit comprising an arrayed waveguide grating filter which has a core and a clad formed on a substrate, wherein the arrayed waveguide grating filter comprises:

at least one input optical waveguide which inputs signal light;

a first optical slab waveguide which is optically connected with said input optical waveguide;

arrayed optical waveguides which are optically connected with said first optical slab waveguide, and which become longer with a predetermined waveguide length difference in succession;

a second optical slab waveguide which is optically connected to said arrayed optical waveguides; and

at least one output optical waveguide which is optically connected to said second optical slab waveguide; and

that each of said arrayed optical waveguides comprises:

mode re-coupling means for re-coupling a higher-order mode and a radiation mode to the signal light, at a part optically touching said first optical slab waveguide; and

mode coupling means for coupling the signal light to the higher-order mode and the radiation mode, at a part optically touching said second optical slab waveguide;

said mode coupling means and said mode re-coupling means being optical waveguides each of which has a core width varied continuously.

38.-71. **(Cancelled)**